

Planning The Arkansas High Accuracy Reference Network (HARN)

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Background

The National Geodetic Survey (NGS) has developed a set of strategic goals that include among others, (1) the establishment of a Federal Base Network (FBN); a set of high accuracy geodetic control stations at roughly 100 km spacing, (2) providing assistance, coordination, and support in establishing a Cooperative Base Network (CBN) which densifies the FBN at 25-50 km spacing, and (3) the establishment of high accuracy geodetic control at selected airports in support of the Federal Aviation Administration (FAA) and the airline industry, thereby helping to sustain the air transportation infrastructure.

In accordance with these strategic goals, NGS, in cooperation with the Arkansas State Highway & Transportation Department (AHTD) and the Center for Advanced Spatial Technologies (CAST) at the University of Arkansas in Fayetteville, plans to perform a HARN survey beginning in January 1997.

HARN surveys have been an ongoing high-priority activity at NGS since 1988, even before the strategic plan was fully developed. Typically, the HARN surveys have been accomplished on a state-by-state basis with NGS performing the survey in cooperation with the lead surveying organization(s) in the state. By the end of 1996, NGS field crews and cooperating organizations will have completed HARN surveys in 44 states. The HARN surveys in the remaining six states will probably be completed in 1997.

Project Definition

The Arkansas HARN will be defined by the requirements and resources of NGS, AHTD, CAST, and any other surveying organizations that become involved. The following paragraphs list the HARN requirements to date.

In order to satisfy FBN requirements, NGS will perform an A-order survey first. The A-order survey is designed to achieve one part in 10,000,000 horizontal accuracy, and requires 3 days of observations at each site. The A-order survey will establish stations at roughly 300 km spacing throughout the state, about six or seven stations, and will also include existing A-order stations in adjacent states, for an additional five or six stations.

The subsequent B-order survey will include the establishment of HARN stations at more than 50 airports, to satisfy the FAA requirement. These particular HARN stations are also labeled Primary Airport Control Stations (PACS) by FAA. The PACS stations in Arkansas will more than satisfy the 100 km spacing requirement, therefore no additional FBN stations need to be set. NGS will also perform observations, simultaneously with the PACS, at existing HARN stations in adjacent states in order to maintain consistency across state borders.

AHDT plans to extend the HARN to include five pairs of high accuracy stations for use with a future AHDT Continuous Data Acquisition System.

CAST is presently soliciting support from other surveying organizations in the state for extending the HARN.

Things To Do

The first order of business is to draft a Cooperative Agreement. In some past agreements, NGS was willing to perform the entire HARN survey and be reimbursed for anything beyond the federal responsibility. However, NGS no longer has the personnel to devote to a 25-50 km spacing survey without having the cooperation of other organizations supplying both GPS receivers and people to operate them. The agreement will therefore be one in which there is no exchange of money; instead, various organizations in Arkansas would agree to work with NGS in performing the survey. NGS will be working closely with AHDT and CAST in the near future in drafting the agreement. Surveying organizations that wish to participate in the HARN survey should contact:

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The Cooperative Agreement could include a provision for a workshop to instruct participants in subjects relating to the HARN survey. (This provision would require reimbursement to NGS for the instructor's travel and per diem.) Subjects might include reconnaissance and mark setting, observing procedures, data reduction and adjustment, and maintenance of the HARN. Such a workshop would be given sometime after the agreement is signed and before the field observations begin.